WHAT IS CLAIMED IS:

1. A method of reducing nonspecific binding of target molecules to a surface, the method comprising:

providing a sample comprising target molecules;

providing a solid phase material comprising a hydrophobic portion and capture sites;

providing a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

optionally providing a secondary blocking agent;

contacting the solid phase material with the fluorinated nonionic surfactant and optionally contacting the solid phase material with the secondary blocking agent to block at least a portion of the hydrophobic portion of the solid phase material;

contacting the blocked solid phase material with the sample to adhere at least a portion of the target molecules of the sample to the capture sites; and

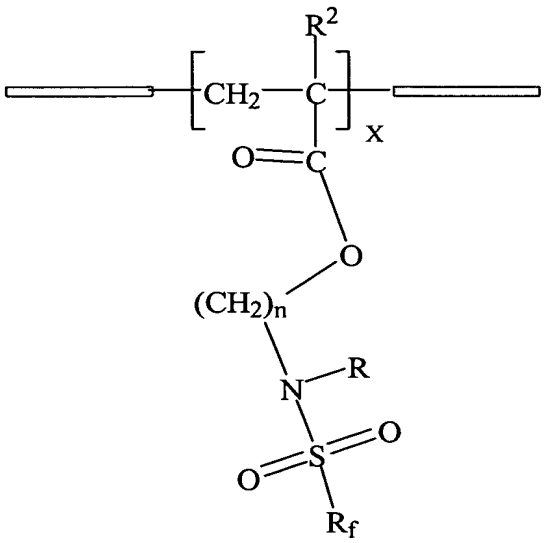
optionally removing at least a portion of the adhered target molecules of the sample from the blocked solid phase material.

2. The method of claim 1 wherein the solid phase material is porous.

3. The method of claim 2 wherein the solid phase material comprises a polytetrafluoroethylene fibril matrix and sorptive particles enmeshed in the matrix, wherein the sorptive particles comprise the capture sites.

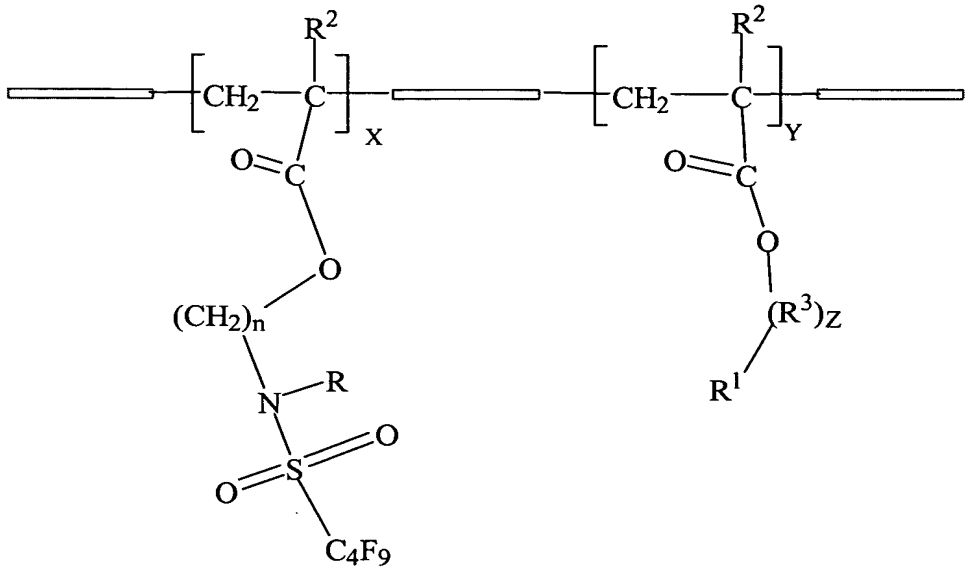
4. The method of claim 1 wherein the secondary blocking agent comprises a polypeptide, a nucleic acid, a surfactant, a stabilizing agent, a lipid, a biological sample, or combinations thereof.

5. The method of claim 1 wherein the fluorinated surfactant includes at least one unit of the following formula (I):



wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R_f is a (C3-C10) linear or branched perfluorinated group; R and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; and x is at least 1.

6. The method of claim 5 wherein the fluorinated surfactant is of the following formula (II):



wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R, R^1, and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; R^3 is a straight or branched alkylene-oxy group, linked together and having 2-6 carbon atoms, or a straight or branched alkylene group having 12-20 carbon atoms; and x, y, and z are each independently at least 1.

7. The method of claim 1 wherein at least 50% of the adhered target molecules are released upon removing at least a portion of the adhered target molecules of the sample from the blocked solid phase material.

8. The method of claim 7 wherein at least 90% of the adhered target molecules are released upon removing at least a portion of the adhered target molecules of the sample from the blocked solid phase material.

9. The method of claim 1 wherein the capture sites comprise hydrophobically attached molecules.

10. The method of claim 9 wherein providing a solid phase material comprising a hydrophobic portion and capture sites comprises:

providing a solid phase material comprising a hydrophobic portion;

providing a capture protein; and

contacting solid phase material with the capture protein to hydrophobically attach the capture protein and provide capture sites.

11. The method of claim 10 wherein the capture protein comprises Protein A, Protein G, lectins, antibodies, avidin, streptavidin, receptor proteins, or mixtures thereof.

12. The method of claim 1 wherein the capture sites comprise covalently attached molecules.

13. The method of claim 12 wherein the covalently attached molecules comprise proteins, metal affinity ligands, boronates, protein binding dyes, polypeptides, Protein A mimetics, oligonucleotides, or mixtures thereof.

14. A method of reducing nonspecific binding of target molecules to a surface, the method comprising:

providing a sample comprising target molecules;

providing a solid phase material comprising a polytetrafluoroethylene fibril matrix and sorptive particles enmeshed in the matrix;

providing a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

optionally providing a secondary blocking agent;

contacting the solid phase material with the fluorinated nonionic surfactant and optionally contacting the solid phase material with the secondary blocking agent to block at least a portion of the polytetrafluoroethylene fibril matrix;

contacting the blocked solid phase material with the sample to adhere at least a portion of the target molecules of the biological sample to the sorptive particles; and

removing at least a portion of the adhered target molecules of the sample from the blocked solid phase material.

15. A method of reducing nonspecific binding of molecules to a surface, the method comprising:

providing a solid phase material comprising a hydrophobic portion;

providing a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

optionally providing a secondary blocking agent; and

contacting the solid phase material with the fluorinated nonionic surfactant and optionally contacting the solid phase material with the secondary blocking agent to block at least portion of the hydrophobic portion.

16. A method of reducing nonspecific binding of target molecules to a surface, the method comprising:

providing a sample comprising target molecules;

providing a solid phase material comprising a hydrophobic portion and one or more hydrophobically attached capture proteins;

providing a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

contacting the solid phase material with the fluorinated nonionic surfactant to block at least a portion of the hydrophobic portion of the solid phase material;

contacting the blocked solid phase material with the sample to adhere at least a portion of the target molecules of the sample to the one or more capture proteins; and

optionally removing at least a portion of the adhered target molecules of the sample from the blocked solid phase material.

17. A method of modifying a surface, the method comprising:

providing a solid phase material comprising a hydrophobic portion;

providing a protein and contacting the protein to the solid phase material to hydrophobically attach the protein;

providing a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments; and

contacting the solid phase material with the fluorinated nonionic surfactant to reduce nonspecific binding of other molecules to the solid phase material.

18. A kit comprising:

a solid phase material comprising a hydrophobic portion;

a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

an optional secondary blocking agent; and

instructions for carrying out the method of claim 1.

19. The kit of claim 18 wherein the fluorinated nonionic surfactant is disposed on the solid phase material.

20. A kit comprising:

a solid phase material comprising a hydrophobic portion;

a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

an optional secondary blocking agent; and

instructions for carrying out the method of claim 15.

21. The kit of claim 20 wherein the fluorinated nonionic surfactant is disposed on the solid phase material.

22. A kit comprising:

a solid phase material comprising a polytetrafluoroethylene fibril matrix and sorptive particles enmeshed in the matrix;

a fluorinated nonionic surfactant comprising two or more fluorinated hydrophobic segments and one or more hydrophilic segments;

an optional secondary blocking agent; and

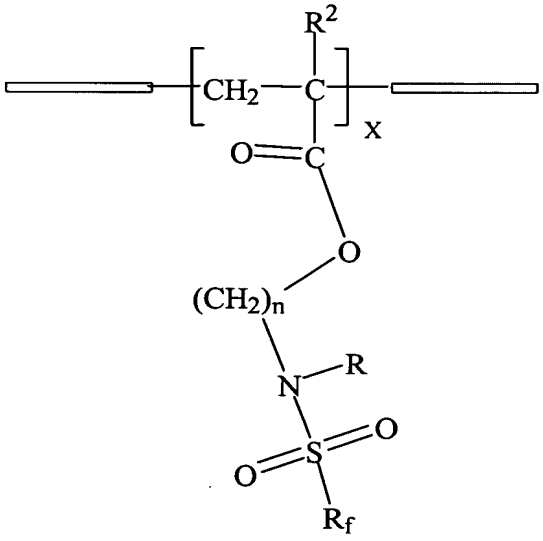
instructions for carrying out the method of claim 14.

23. A material comprising a solid phase material having a fluorinated nonionic surfactant disposed thereon; wherein:

the solid phase material comprises a polytetrafluoroethylene fibril matrix and sorptive particles enmeshed in the matrix; and

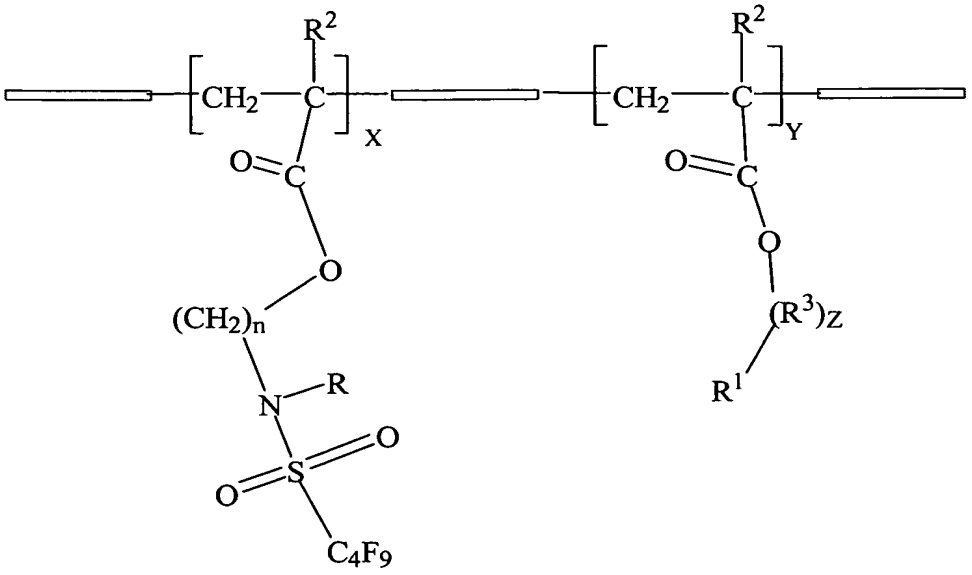
the fluorinated nonionic surfactant comprises two or more fluorinated hydrophobic segments and one or more hydrophilic segments.

24. The material of claim 23 wherein the fluorinated surfactant includes at least one unit of the following formula (I):



wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R_f is a (C3-C10) linear or branched perfluorinated group; R and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; and x is at least 1.

25. The material of claim 23 wherein the fluorinated surfactant is of the following formula (II):



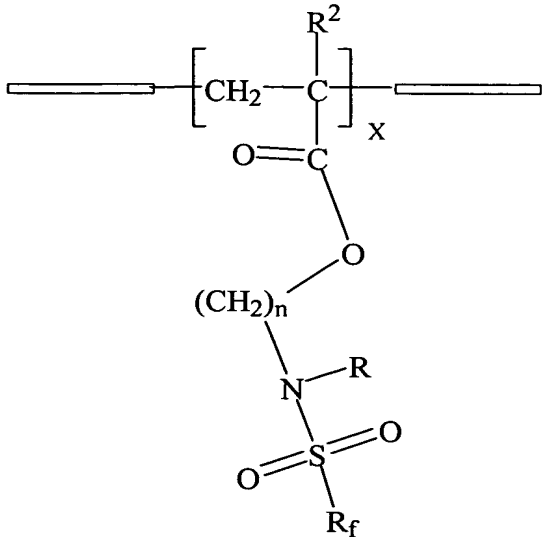
wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R, R^1, and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; R^3 is a straight or branched alkylene-oxy group, linked together and having 2-6 carbon atoms, or a straight or branched alkylene group having 12-20 carbon atoms; and x, y, and z are each independently at least 1.

26. A material comprising a solid phase material having a fluorinated nonionic surfactant disposed thereon; wherein:

the solid phase material comprises a thermally induced phase separation membrane; and

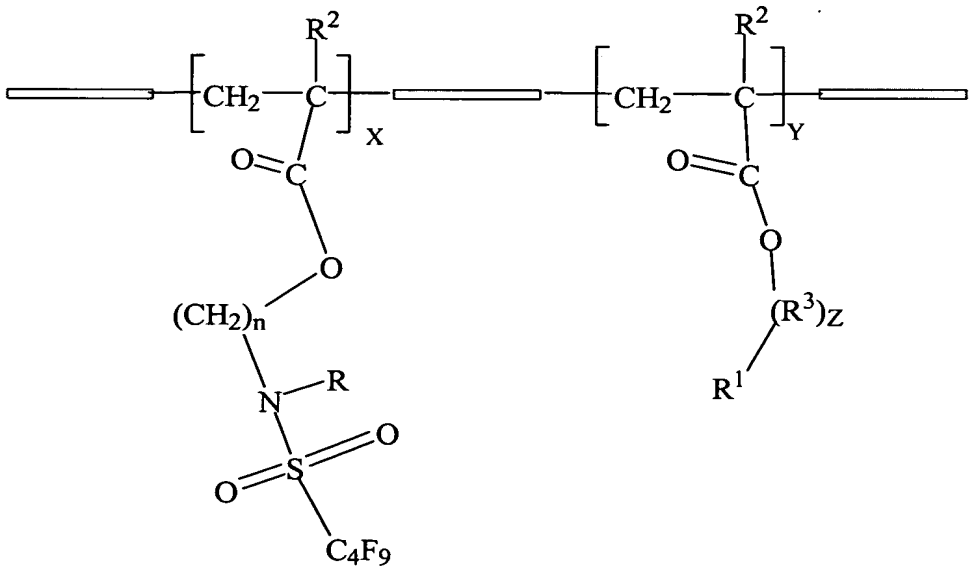
the fluorinated nonionic surfactant comprises two or more fluorinated hydrophobic segments and one or more hydrophilic segments.

27. The material of claim 26 wherein the fluorinated surfactant includes at least one unit of the following formula (I):



wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R_f is a (C3-C10) linear or branched perfluorinated group; R and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; and x is at least 1.

28. The material of claim 26 wherein the fluorinated surfactant is of the following formula (II):



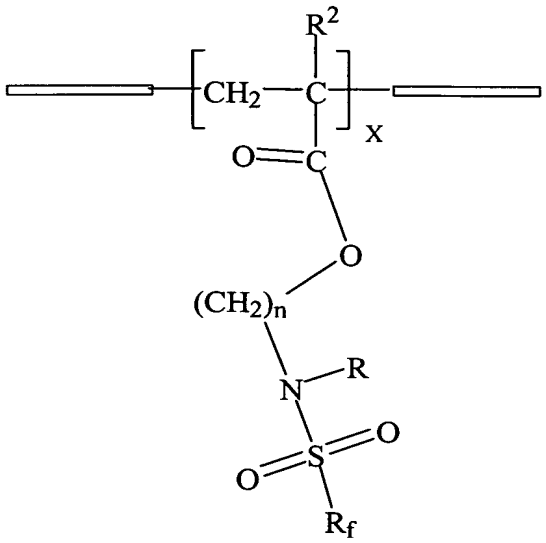
wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R, R^1, and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; R^3 is a straight or branched alkylene-oxy group, linked together and having 2-6 carbon atoms, or a straight or branched alkylene group having 12-20 carbon atoms; and x, y, and z are each independently at least 1.

29. A material comprising a solid phase material having a fluorinated nonionic surfactant disposed thereon; wherein:

the solid phase material comprises high internal phase emulsion; and

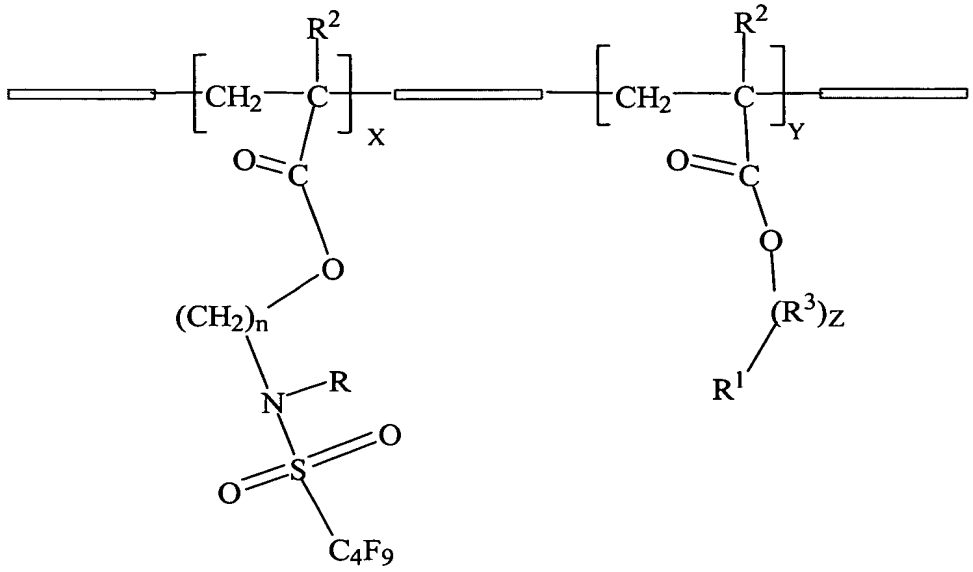
the fluorinated nonionic surfactant comprises two or more fluorinated hydrophobic segments and one or more hydrophilic segments.

30. The material of claim 29 wherein the fluorinated surfactant includes at least one unit of the following formula (I):



wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R_f is a (C3-C10) linear or branched perfluorinated group; R and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; and x is at least 1.

31. The material of claim 29 wherein the fluorinated surfactant is of the following formula (II):



wherein: the rectangular box represents a bond in a polymerizable or polymer chain; R, R^1, and R^2 are each independently hydrogen or a C1-C4 alkyl group; n is an integer of 2 to 10; R^3 is a straight or branched alkylene-oxy group, linked together and having 2-6 carbon atoms, or a straight or branched alkylene group having 12-20 carbon atoms; and x, y, and z are each independently at least 1.